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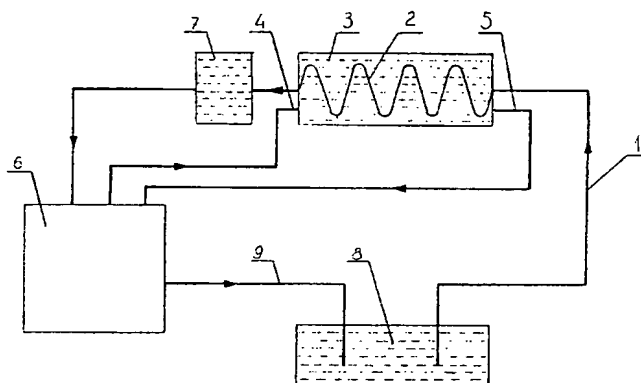
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD OF HEATING DIESEL OIL BEFORE ITS INTAKE TO THE ENGINE AND THE DEVICE FOR IMPLEMENTATION



(57) Abstract: This invention is related to the methods and ways of heating the fuel, dedicated for optimization of combustion processes in diesel motors and furnaces that work on diesel oil and bucking furnace fuel, chiefly with high contents of paraffin, and that can be used in fuel systems of auto tractor diesel motors for prevention of paraffin fall-out from diesel oil under conditions of negative temperatures. The method of working of the diesel oil before its intake to the engine, including fuel supply on the fuel line and heating of the fuel line's segment with heat liquid of the engine cooling system, and along with the heating process the fuel is subject to the electromagnetic effect, the frequency of which corresponds to the resonance frequencies of radiation of fundamental particles of the fuel. The device for working of the diesel oil before its intake to the engine contains the fuel line with the heating segment made in the form of the coil pipe and located in the capacitance, which in turn is connected by the pipelines with the engine cooling system, and the heating segment made in the form of coil pipe is produced from the stainless steel or alloys of aluminum, or refined copper.

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METHOD OF HEATING DIESEL OIL BEFORE ITS INTAKE TO THE ENGINE AND THE DEVICE FOR IMPLEMENTATION

Technical Field.

15        This invention is related to the methods and ways of heating the fuel, dedicated for optimization of combustion processes in diesel motors and furnaces that work on diesel oil and bucking furnace fuel, chiefly with high contents of paraffin, and that can be used in fuel systems of auto tractor diesel motors for prevention of paraffin fall-out  
20    from diesel oil under conditions of negative temperatures.

Background Art

Known way of preliminary preparation of the diesel oil before its feeding to the engine (patent of USA №5511530 A, F 02M31/00, pub.  
25    in 1994y.) includes heating of the fuel by influence of electric current on it.

There are many devices for implementation of the given method of preparation of the diesel oil before its intake to the engine.

The modular electric heater is known (patent of USA №5511530 F 02M31/00, pub. in 1994y.) where the process of heating is realized  
5 using the electric heating element made by the way of a chromic nickel spiral, which is coiled on the fuel line and connected up to the electric network of the engine.

Another known heater of the diesel oil (patent of Russia, №2030631, F 02M31/00, pub. in 1994y.) contains heat-insulated  
10 capacitance that is fixed on the inlet elbow of a fuel tank where paralleled electric heating elements and the device of a mechanical intermingling of fuel with the drive in the form of electric motor, connected to the heating elements using series connection, are installed.

One more heater of the diesel oil is known (patent of Russia  
15 №2007609, F 02M31/12, pub. in 15/02/94) that contains plastic cylindrical body, delivering and assigning connecting pipes, fuel filter and electric current source connected with one of the connecting pipes. Electro-conductive bush, dielectric bush and electro-conductive element connected with the electric current source are located inside  
20 the cylindrical body. The electro-conductive element in the form of carbonic threads is connected with the electro-conductive bush and the removing connecting pipe, and electro-connecting bush is, in turn, connected with the electric current source.

The next known heater of the diesel oil (patent of Russia  
25 №1619781, F 02M31/125, pub. in 1988y.) contains the body of the secondary filter of fuel, filter pack, electric heater element in the form

of sleeve from a carbonic tissue or carbonic fibres that is located between the body and filter pack, and electric current source connected with the electric heater element.

All these inventions are made on reasonably high enough level.

5 However, in case of any mechanical damage in electric circuit of diesel motors, ensuring the power supply to electric heating elements, and the subsequent short circuit, the possibility of flaring up of the engine is not eliminated. In addition, all devices mentioned above are too complicated and have considerable size and weight.

10 The known method of increase of operating characteristics of the engine and the device for its implementation (patent of USA №4469076, 123-538, pub.in1984y.) using the magnetic field with a magnetic density of 2000-12500 Gs for processing the fuel before its intake to the engine.

15 Another known method of preliminary preparation of the fuel, mainly of internal-combustion engine, (patent of Russia №2028491, F 02M 27/00, pub. in 1995y.) is by the way of effecting the fuel in the maiden intermediate chamber by a granulouse filling material from tin or its alloy with lead at its heating to temperature 70-80°C. Further the  
20 fuel is directed to the internal intermediate chamber where it is processed by the magnetic field with presence of tin or its alloys with induction 1,00-2,00T, and the effect of fuel and its processing is implementing for 40-90 seconds.

The device for implementation of the given method (patent of  
25 Russia №2028491, F 02M 27/00, pub. in 1995y.) contains cylindrical body from diamagnetic material, in end covers of which the fitting

pipes of an intake of fuel are installed. There is a series connected input distributed channel inside the body, the maiden intermediate chamber filled with granulose filling material from tin or its alloys with lead and the second intermediate chamber. It is separated from the first one  
5 with help of transversal cover with foramens on its peripherals having elements from magnetic material.

However, known inventions indicated above can not be used while using the fuel oil high in of paraffin.

The closest technical solution to stated is the method of working  
10 of the diesel oil sent up by pipe lines before intake to the engine (preliminary patent of Kazakhstan №8539, F 02M53/02, pub. in 1999y.) containing heating of a segment of the fuel line with heat liquid fuel from an engine cooling system, for example, water or antifreezing compound.

15 The device for implementing the given method of working of the diesel oil (preliminary patent of Kazakhstan №8539, F 02M53/02, pub. in 1999y.) contains capacitance with fitting pipes for connection with the engine cooling system and a segment of fuel line made in the form of coil pipe located in the capacitance and connected with the fuel line.

20 The known inventions mentioned above are reasonably effective and secure for optimization of combustion processes in engines operating on the fuel oil with the minor portion of paraffin, but they do not ensure the required conditions for destruction of paraffin molecules when the proportion of paraffin is high in. In the given solutions these  
25 conditions can be achieved at the expense of intensification of fuel heating by the way of lengthening the coil pipe, which in turn leads to

substantial increase of the whole device's size and weight. In a number of cases it impedes and even sometimes makes impossible its installation in automobile. In addition, in case of high flow of fuel, on heavy vehicles in particular, implementation of the given solutions is  
5 inefficient due to lack of time for fuel to be proceeded.

#### Disclosure of Invention.

The purpose of the offered invention is to create secure method of working of the diesel oil before its intake to the engine and the  
10 device for implementation and facilitation of start and exploitation of diesel in cold seasons, with help of intensification of the diesel working process that helps to increase the plant's productivity and decrease its overall dimensions at the same time.

Intensification of the process of fuel processing is accomplished  
15 by the fact that the working process of the diesel oil before its intake to the engine includes fuel supply on the fuel line, heating of a segment of the fuel line by heat liquid from the engine cooling system, and along with the heating process the fuel is subject to electromagnetic effect, the frequency of which corresponds to resonance frequencies of  
20 radiation of fuel's fundamental particles.

The increase of productivity of the device, simultaneously with the decrease of its overall dimensions is accomplished due to inclusion of the fuel line with the heating segment, made in the form of a coil pipe located in the capacitance, which in turn is connected by pipe lines  
25 with the engine cooling system, under condition that the heating

segment in the form of coil pipe is made of a stainless steel or alloys of aluminum, or from refined copper.

The outcomes of research works that were conducted in 1999-2001yy are trusted to in the fundamentals of tendered engineering solutions.

What was detected, is that at heating metals and the alloys beam electromagnetic waves of definite frequency. The emission power thus depends on a heating degree of these stuffs. The resonance occurs at coincidence of radiated frequency of the material with radiated frequency of molecules of the liquid medium. At this time intensity of processes descending in fluid hydrocarbon fuel increases sharply, destruction of paraffin molecules in particular. After this paraffin changes its structure and gains properties of the fuel. Thereof the combustion ratio of fuel in the engine is augmented, which in turn leads to decline of the contents of harmful and polluting components in an exhaust of the diesel engine and increase of its efficiency.

In result, the intensification of the fuel's processing process facilitating the start and exploitation of diesels in cold seasons was achieved, which allows increasing productivity of the device and decreasing its overall dimensions at the same time.

While using the tendered device the power of the diesel motor was considerably advanced. It became more dynamical, the noise and chattering of the working diesel engine decreased, exhausts and toxicity (carbon monoxide and nitrogen dioxide) declined in several times, and what is the most important – the winter idle time owing to frozen fuel stopped.

The offered method and device for its implementation were tested in practice during this time on 70 automobiles with diesel engines, starting from cars with small capacity (volume of the engine 1.5l), minibuses and jeeps with medium capacity (volume of the engine 2.3 – 4.2l) and finishing with the 25-tonnes truck “Iveco-Magirus” (volume of the engine 12l).

#### Brief Description of Drawings.

On the fig.1 scheme of the device realizing the tendered method of working of the diesel oil before its intake to the engine is presented. Device for working of the diesel oil includes the fuel line 1 with a segment of heating made in the form of the coil pipe 2 and made from a stainless steel or alloys of aluminum, or refined copper. The coil pipe 2 is located in the capacitance 3 that is connected by pipelines 4 and 5 with the engine cooling system 6.

The device mentioned above is located before admission in the engine 6 between the fuel tank 7 and fuel filter 8, which in turn is connected with the engine 6 and the fuel line 9.

The device works in the following way.

From the engine cooling system 6 through the pipeline 4 the cooling liquid heated by temperature 80-95C is sent up to the capacitance 3. After the capacitance 3 is filled in, the liquid is sent back through the pipeline 5 to the engine cooling system 6. That is its circulation.

From the fuel tank 8 through the fuel line 1 the fuel goes to the coil pipe 2 located in the capacitance 3 and the liquid heats it by



temperature 40-65C. The heated fuel easily passes through the fuel filter 5. At the same time the material from which the coil pipe 2 is made is heated as well and starts to beam electromagnetic waves including such, the frequency of which corresponds to the resonance frequencies of radiation of fundamental particles of the fuel. Under effect of these waves the liquefactive paraffin changes its structure. It gains properties of the fuel and together with the fuel combusts in the engine chamber 6.

The excesses of the heat fuel on the reflexive fuel line 9 go in the fuel tank 8 increasing the fuel's temperature. This decreased the possibility of loss of moisture (condensate), the hit of which in the fuel instrumentation reduces service life of the last.

#### Industrial Applicability.

The offered method of working of the diesel oil before its intake to the engine and the device for implementation can be produced serially from the stainless steel or alloys of aluminum, or from refined copper.

Application of the given method and device assures easy engine start-up and its stable running even at the lowest temperatures of environment, economies of the fuel, increase of the power both resource of fuel instrumentation and diesel engine and also decrease of harmful lets thanks to more complete combustion of the fuel.

The formula of the invention.

The method of working of the diesel oil before its intake to the engine  
and the device for its implementation.

5

1. The method of working of the diesel oil before its intake to the engine, including fuel supply on the fuel line and heating of the fuel line's segment with heat liquid of the engine cooling system, distinguished by the fact that along with the heating process the fuel  
10 is subject to the electromagnetic effect, the frequency of which corresponds to the resonance frequencies of radiation of fundamental particles of the fuel.

2. The device for working of the diesel oil before its intake to the engine contains the fuel line (1) with the heating segment made in the  
15 form of the coil pipe (2) and located in the capacitance (3), which in turn is connected by the pipelines (4,5) with the engine cooling system (6) and distinguished by the fact that the heating segment made in the form of coil pipe (2) is produced from the stainless steel or alloys of  
20 aluminum, or refined copper.

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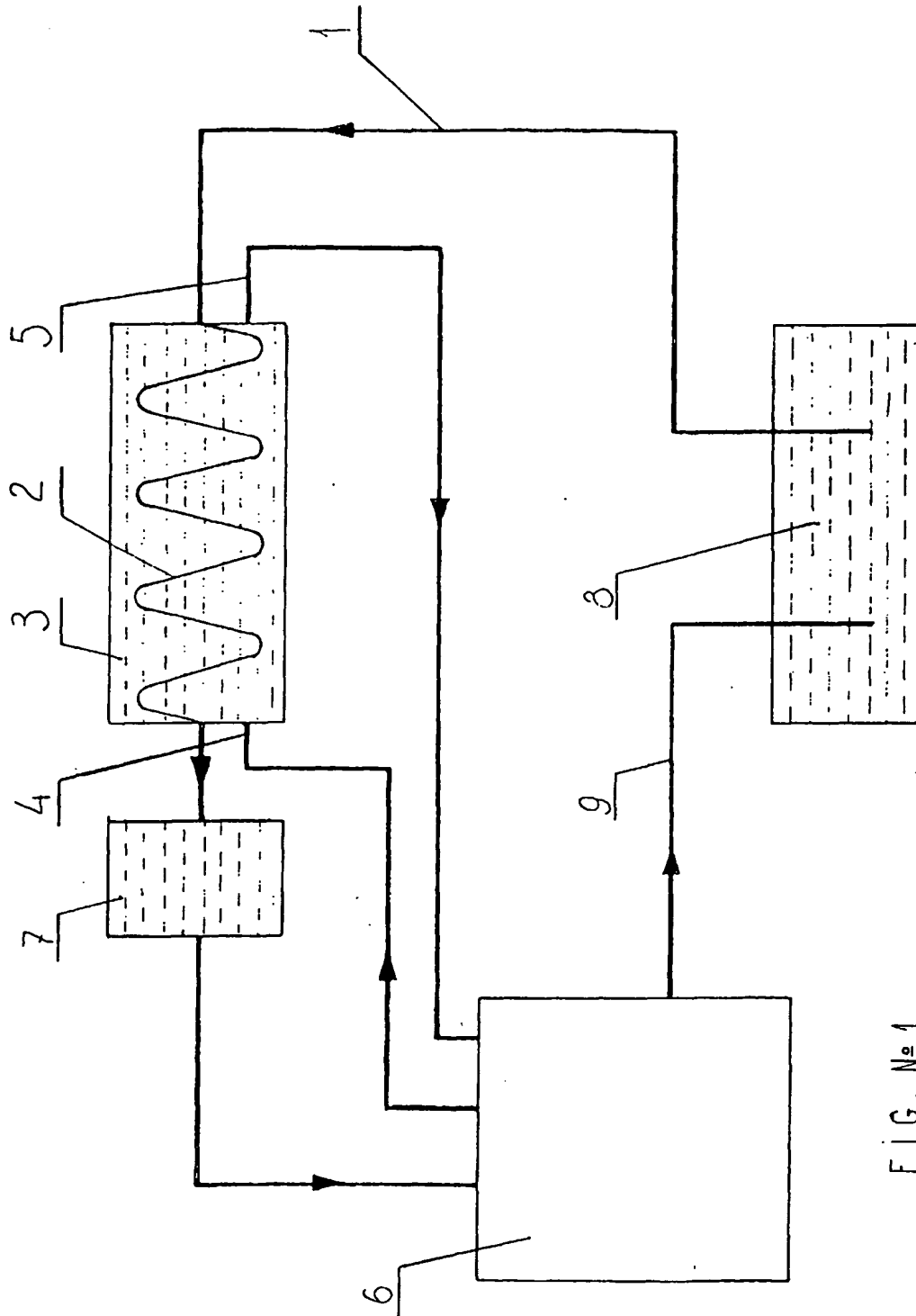


FIG. № 1

## INTERNATIONAL SEARCH REPORT

tional Application No

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A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 F02M31/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 017 123 A (MINOUX JEAN PIERRE) 15 October 1980 (1980-10-15) page 1, line 23 -page 2, line 9; figure 1 ---	1,2
X	FR 2 598 464 A (ANDRIGHETTI ALBERT) 13 November 1987 (1987-11-13) page 1, line 20 - line 34; figure 1 ---	1,2
X	DE 42 13 583 A (TRABOLD HERMANN) 29 October 1992 (1992-10-29) column 1, line 3 -column 2, line 52; figure 2 ---	1
X	US 4 700 047 A (CROSSETT JOSEPH J ET AL) 13 October 1987 (1987-10-13) abstract --- -/--	1

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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## INTERNATIONAL SEARCH REPORT

International Application No  
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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